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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/052,703	01/16/2002	Sang-Bom Kang	9898-207	1366

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EXAMINER
ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

File Copy

Office Action Summary	Application No.	Applicant(s)	
	10/052,703	KANG ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- *Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.*
- *If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.*
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) *38-40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *Two IDSs* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-37, drawn to a shower head for supplying a reaction gas, classified in class 118, subclass 715.

II. Claims 38-40, drawn to a method for reducing processing time in a deposition process, classified in class 427, subclass 237.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatus as claimed can be used to practice another and materially different process, for example, an etching process.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Adrian for Allan T. McCollum on September 3, 2003 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-37. Affirmation of this election must be made by applicant in replying to this Office action. Claims 38-40 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-9, 12, 14, 15, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al (USPat. 4,534,816). Chen teaches a shower head (14, 16, 12; Figure 1; column 3, lines 20-48) for supplying a reaction gas ("Reactive Gas", 18; Figure 1; column 3, lines 20-48) to a wafer in a process chamber (30; Figure 1; column 4, lines 1-29), the shower head (14, 16, 12; Figure 1; column 3, lines 20-48) comprising: a plurality of plates (14, 16, 12; Figure 1; column 3, lines 20-48) comprising gas paths (54; Figure 1-4; column 4, lines 56-69) for supplying a reaction gas ("Reactive Gas", 18; Figure 1; column 3, lines 20-48) to a wafer; and a cooling system (22, 56;Figure 1, 3-6; column 5, lines 3-28) comprising a plurality of coolant inlets (56;Figure 5; column 5, lines 3-28) and a plurality of coolant outlets (62;Figure 5; column 5, lines 3-28) formed in a lower one (12; Figure 6; column 4, lines 56-68) of the plurality of plates (14, 16, 12; Figure 1; column 3, lines 20-48), and further comprising a plurality of inner cooling

lines (channel between 56 and 62; Figure 5) configured to connect each of the plurality of coolant inlets (56;Figure 5; column 5, lines 3-28) to one of the plurality of coolant outlets (62;Figure 5; column 5, lines 3-28), as claimed by claim 1.

Chen teaches:

i. A shower head (14, 16, 12; Figure 1; column 3, lines 20-48) according to claim 1, wherein the plurality of coolant inlets (56;Figure 5; column 5, lines 3-28) and the plurality of coolant outlets (62;Figure 5; column 5, lines 3-28) are formed on a side of the lower plate (12; Figure 6; column 4, lines 56-68), as claimed by claim 2

ii. A shower head (14, 16, 12; Figure 1; column 3, lines 20-48) according to claim 1, wherein at least four coolant inlets (56;Figure 5; column 5, lines 3-28), at least four coolant outlets (62;Figure 5; column 5, lines 3-28), and at least four inner cooling lines (channel between 56 and 62; Figure 5) are formed, as claimed by claim 3

iii. A shower head (14, 16, 12; Figure 1; column 3, lines 20-48) according to claim 1, wherein the plurality of coolant inlets (56;Figure 5; column 5, lines 3-28) are formed on a first side of the lower plate (12; Figure 6; column 4, lines 56-68), the plurality of coolant outlets (62;Figure 5; column 5, lines 3-28) are formed on a second side of the lower plate (12; Figure 6; column 4, lines 56-68), and the plurality of inner cooling lines (channel between 56 and 62; Figure 5) are formed parallel to each other, as claimed by claim 4

iv. A shower head (14, 16, 12; Figure 1; column 3, lines 20-48) according to claim 1, wherein a first coolant inlet (any of 62;Figure 5; column 5, lines 3-28) is connected to a first coolant outlet (any of 56;Figure 5; column 5, lines 3-28) by a first inner cooling line (channel between any of 56 and any of 62; Figure 5), wherein a second coolant outlet (any other of

62;Figure 5; column 5, lines 3-28) is connected to a second coolant inlet (any other of 56;Figure 5; column 5, lines 3-28) by a second inner cooling line (any other channel between any of 56 and any of 62; Figure 5), and wherein the second coolant outlet (any other of 62;Figure 5; column 5, lines 3-28) is located adjacent to the first coolant inlet (any of 62;Figure 5; column 5, lines 3-28) on a first side of the lower plate (12; Figure 6; column 4, lines 56-68), as claimed by claim 5

v. A shower head (14, 16, 12; Figure 1; column 3, lines 20-48) according to claim 1, wherein a first coolant outlet (any of 56;Figure 5; column 5, lines 3-28) is connected to a first coolant inlet (any of 62;Figure 5; column 5, lines 3-28) by a first inner cooling line (channel between any of 56 and any of 62; Figure 5), and wherein the first coolant outlet (any of 56;Figure 5; column 5, lines 3-28) is positioned approximately 90 degrees from a position of the first coolant inlet (any of 62;Figure 5; column 5, lines 3-28) along an circumferential edge of the lower plate (12; Figure 6; column 4, lines 56-68), as claimed by claim 6

vi. A shower head (14, 16, 12; Figure 1; column 3, lines 20-48) according to claim 6, wherein a second coolant inlet (any other of 56;Figure 5; column 5, lines 3-28) is located adjacent to the first coolant outlet (any of 56;Figure 5; column 5, lines 3-28), wherein the second coolant outlet (any other of 62;Figure 5; column 5, lines 3-28) is connected to a second coolant inlet (any other of 56;Figure 5; column 5, lines 3-28) by a second inner cooling line (any other channel between any of 56 and any of 62; Figure 5), and wherein the second coolant outlet (any other of 62;Figure 5; column 5, lines 3-28) is located approximately 90 degrees from a position of the second coolant inlet (any other of 56;Figure 5; column 5, lines 3-28) along the edge of the lower plate (12; Figure 6; column 4, lines 56-68), and wherein the second coolant

outlet (any other of 62;Figure 5; column 5, lines 3-28) is located approximately 180 degrees from the first coolant inlet (any of 62;Figure 5; column 5, lines 3-28) along the edge of the lower plate (12; Figure 6; column 4, lines 56-68), as claimed by claim 7 – compare Figure 5 of Chen with Figure 4 of the present application

vii. A shower head (14, 16, 12; Figure 1; column 3, lines 20-48) according to claim 1, further comprising: a first outer cooling line (66; Figure 5) arranged outside the lower plate (12; Figure 6; column 4, lines 56-68) to connect the plurality of coolant inlets (56;Figure 5; column 5, lines 3-28); and a second outer cooling line (68; Figure 5) arranged outside the lower plate (12; Figure 6; column 4, lines 56-68) to connect the plurality of coolant outlets (62;Figure 5; column 5, lines 3-28), as claimed by claim 8

viii. an apparatus comprising: a process chamber (30; Figure 1; column 4, lines 1-29); a heater stage (40; Figure 1; column 4, lines 29-39) located in a lower portion of the process chamber (30; Figure 1; column 4, lines 1-29), said heater stage (40; Figure 1; column 4, lines 29-39) configured to support a wafer and to heat the wafer to a high temperature; a shower head (14, 16, 12; Figure 1; column 3, lines 20-48) located in an upper portion of the process chamber (30; Figure 1; column 4, lines 1-29), said shower head (14, 16, 12; Figure 1; column 3, lines 20-48) configured to supply a reaction gas ("Reactive Gas", 18; Figure 1; column 3, lines 20-48) to the wafer; and a rimshaped separating device (44; Figure 1; column 3, lines 62-69) arranged between the process chamber (30; Figure 1; column 4, lines 1-29) and the heater stage (40; Figure 1; column 4, lines 29-39) – compare Figure 1 of Chen with Figure 1 of the present Application, said rimshaped separating device (44; Figure 1; column 3, lines 62-69) configured to separate the heater stage (40; Figure 1; column 4, lines 29-39) from the process

chamber (30; Figure 1; column 4, lines 1-29) and to reduce a volume of processing space within the process chamber (30; Figure 1; column 4, lines 1-29), as claimed by claim 9 – That Applicant claims an apparatus for forming a thin film is a statement of intended use of the apparatus. It is well established that apparatus claims must be structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ."(emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Exparte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

ix. An apparatus according to claim 9, wherein the rimshaped separating device (44; Figure 1; column 3, lines 62-69) is configured to separate the heater stage (40; Figure 1; column 4, lines 29-39) and the process chamber (30; Figure 1; column 4, lines 1-29) by a uniform distance, as claimed by claim 12

x. An apparatus according to claim 9, wherein the rimshaped separating device (44; Figure 1; column 3, lines 62-69) is formed of a heat-resistant material (column 6, lines 5-15), as claimed by claim 14

xi. An apparatus according to claim 14, wherein the heat-resistant material (column 6, lines 5-15) is a ceramic material ("glass ceramic, quartz..."; column 6, lines 5-15), as claimed by claim 15

xii. An apparatus according to claim 9, further comprising a process chamber (30; Figure 1; column 4, lines 1-29) cooling system (52;Figure 1, column 4, lines 29-39) configured to cool a bottom surface of the process chamber (30; Figure 1; column 4, lines 1-29) whereon the rimshaped separating device (44; Figure 1; column 3, lines 62-69) is located, as claimed by claim 19

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 10, 11, 13, 16-18, and 20-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (USPat. 4,534,816) in view of Sato (USPat. 6,120,605). Chen is discussed above. Chen further teaches an apparatus further comprising the process chamber (30; Figure 1; column 4, lines 1-29) cooling system (22, 56;Figure 1, 3-6; column 5, lines 3-28) arranged in thermal communication with the lower portion of the process chamber (30; Figure 1; column 4, lines 1-29), said lower portion of the process chamber (30; Figure 1; column 4, lines 1-29) supporting the rimshaped separating device (44; Figure 1; column 3, lines 62-69). Chen does not teach his operating temperature.

Chen further does not teach:

i. Chen's rimshaped separating device (44; Figure 1; column 3, lines 62-69) contacts Chen's bottom of Chen's heater stage (40; Figure 1; column 4, lines 29-39), as claimed by claim 11, 34

ii. An apparatus according to claim 12, wherein Chen's heater stage (40; Figure 1; column 4, lines 29-39) and Chen's process chamber (30; Figure 1; column 4, lines 1-29) are separated by about 2-10 cm, as claimed by claim 13, 31

iii. Chen's rimshaped separating device (44; Figure 1; column 3, lines 62-69) is configured to closely adhere to Chen's bottom of Chen's heater stage (40; Figure 1; column 4, lines 29-39), as claimed by claim 16

iv. a shaft installed beneath Chen's heater stage (40; Figure 1; column 4, lines 29-39) and configured to raise and lower Chen's heater stage (40; Figure 1; column 4, lines 29-39); and the shaft introduction portion configured to introduce a shaft at a bottom of Chen's process chamber (30; Figure 1; column 4, lines 1-29), as claimed by claim 17

v. An apparatus according to claim 17, wherein the shaft introduction portion is formed as a flexible bellows and has a length that varies as the shaft is raised and lowered, as claimed by claim 18, and 36

vi. Chen's heater stage (40; Figure 1; column 4, lines 29-39) to separate Chen's space beneath Chen's heater stage (40; Figure 1; column 4, lines 29-39) from Chen's process chamber (30; Figure 1; column 4, lines 1-29) space containing Chen's wafer to reduce Chen's process volume of Chen's process chamber (30; Figure 1; column 4, lines 1-29), as claimed by claim 20 – That Applicant claims an apparatus for forming Chen's thin film is Chen's statement of intended use of Chen's apparatus. It is well established that apparatus claims must be

structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ."(emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Exparte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Sato teaches an operating temperature of 360°C (column 7, lines 48-51) including:

vii. Sato's rimshaped separating device (lowest portion of 11; Figure 1) contacts Sato's bottom of Sato's heater stage (17; Figure 1; column 4, lines 44-65), as claimed by claim 11, 34

viii. An apparatus according to claim 12, wherein Sato's heater stage (17; Figure 1; column 4, lines 44-65) and Sato's process chamber (10; Figure 1; column 4, lines 44-65) are separated by about 2-10 cm, as claimed by claim 13, 31

ix. Sato's rimshaped separating device (lowest portion of 11; Figure 1) is configured to closely adhere to Sato's bottom of Sato's heater stage (17; Figure 1; column 4, lines 44-65), as claimed by claim 16

x. a shaft (15; Figure 1; column 4, lines 44-65) installed beneath Sato's heater stage (17; Figure 1; column 4, lines 44-65) and configured to raise and lower Sato's heater stage (17; Figure 1; column 4, lines 44-65); and the shaft (15; Figure 1; column 4, lines 44-65) introduction portion configured to introduce a shaft (15; Figure 1; column 4, lines 44-65) at a bottom of Sato's process chamber (10; Figure 1; column 4, lines 44-65), as claimed by claim 17

xi. An apparatus according to claim 17, wherein the shaft (15; Figure 1; column 4, lines 44-65) introduction portion is formed as a flexible bellows (22; Figure 1; column 4, lines 44-65) and has a length that varies as the shaft (15; Figure 1; column 4, lines 44-65) is raised and lowered, as claimed by claim 18, and 36

xii. Sato's heater stage (17; Figure 1; column 4, lines 44-65) to separate Sato's space beneath Sato's heater stage (17; Figure 1; column 4, lines 44-65) from Sato's process chamber (10; Figure 1; column 4, lines 44-65) space containing Sato's wafer to reduce Sato's process volume of Sato's process chamber (10; Figure 1; column 4, lines 44-65), as claimed by claim 20 – That Applicant claims an apparatus for forming Sato's thin film is Sato's statement of intended use of Sato's apparatus. It is well established that apparatus claims must be structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ."(emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Exparte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Chen's wafer supporting and heating structure with Sato's supporting and heating structure as discussed above to process a wafer at optimal temperatures.

Motivation to replace Chen's wafer supporting and heating structure with Sato's wafer supporting and heating structure as discussed above to process a wafer at optimal temperatures as

discussed above is to provide and alternate and equivalent means for wafer supporting and heating. Further, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

9/8/3